FEMA 390479

FLOOD INSURANCE STUDY

CITY OF SHELBY, OHIO

RICHLAND COUNTY

MARCH 2, 1989

Federal Emergency Management Agency

COMMUNITY NUMBER - 390479

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Shelby, Richland County, Ohio, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

This Flood Insurance Study was prepared by compiling existing hydrologic and hydraulic technical and scientific data prepared originally for purposes other than the National Flood Insurance Program. The data were identified as the best available at the time of compilation of this Flood Insurance Study and should depict the general conditions of the flooding sources with relative accuracy. The Federal Emergency Management Agency (FEMA) performed a cursory review and accepted the data as valid for purposes of this Flood Insurance Study and the National Flood Insurance Program. However, if better information is known to exist or has been developed since the date of this report, the information should be immediately forwarded to the Natural and Technological Hazards Division, FEMA, Chicago, Illinois, for consideration for revision of this study.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were obtained from the report entitled "Flood Plain Management Study, Black Fork of Mohican River and Tributaries, Richland County, Ohio" (Reference 1).

1.3 Coordination

On February 24, 1988, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the community and FEMA.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Shelby, Richland County, Ohio. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected based on the extent and validity of available existing hydrologic and hydraulic data.

Flooding caused by overflow of the Black Fork Mohican River, Tuby Run, Seltzer Park Creek, West Branch Bear Run, Hartman Bargaheiser Ditch, and West Branch was studied in detail.

2.2 Community Description

The City of Shelby is in northwestern Richland County, which lies in north-central Ohio approximately 65 miles north of Columbus. Shelby is served by State Routes 39, 61, 96, and 314, Conrail, and the CSX railroad. The 1980 population of Shelby was reported to be 9,646 (Reference 2).

The climate of the area may be roughly characterized as "continental" in the sense that seasonal temperature fluctuations are moderately wide. Summer is moderately warm and humid with an average of ten days in which the temperature is 90 degrees Fahrenheit (^{o}F) or higher. Winter is reasonably cold and cloudy and has an average of five days in which the temperature is below 0^{o}F. Weather changes occur every few days as a result of passing cold and warm fronts and their associated centers of high and low pressure. Precipitation varies widely from year to year, but is generally abundant and well distributed. However, average monthly precipitation attains a peak in early summer when thunderstorms become more abundant. Fall is generally the driest season. The average annual precipitation is approximately 37 inches.

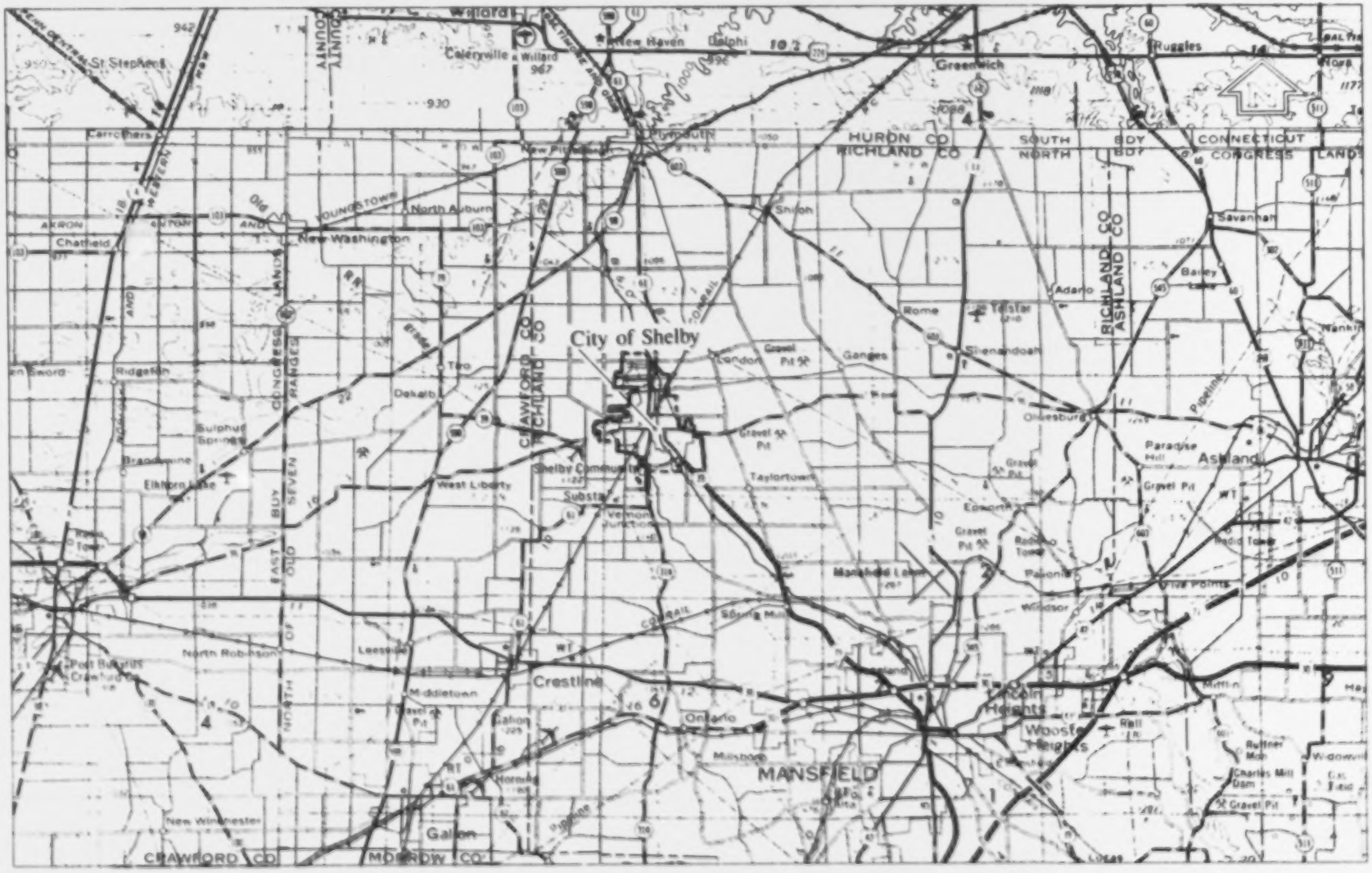
The headwaters of the Black Fork Mohican River lie just south of the City of Shelby. The main stem flows directly north through the center of the city with several small tributaries joining it along the way.

2.3 Principal Flood Problems

Flooding from the Black Fork Mohican River and its tributaries causes both urban and agricultural damage. Approximately 285 commercial and residential properties would be damaged by a flood with a recurrence interval of 100 years.

2.4 Flood Protection Measures

Flood protection measures are not known to exist within the study area.


City of Shelby
MANSFIELD
Crestline
Ashland
New Washington
Plymouth
Shelby
Willard
Greenwich
Ruggles
Savannah
Ganges
Rome
Shenandoah
Onaway
Paradise Hill
Taylortown
Ontario
Woodsfield Heights
Colin Heights
Galion
Ridgefield
Chatfield
Bucyrus
Sulphur Springs
Broadstone
Elkhorn Lake
West Liberty
Middletown
North Robinson
Post Buckeye Crawford
New Winchester
Adario
Bailey
Gravel Pit
Substa
Shelby Cemetery
CRAWFORD CO
RICHLAND CO
ASHLAND CO
HURON CO
MORROW CO
SOUTH NORTH BOY BOY
CONNECTICUT CONGRESS LANDS
Old YOUNGSTOWN AND AKRON ROAD
CONGRESS LANDS
SEVEN RANGES
EAST BUY
NORTH OF OHIO
Pipeline
Conrail
Rail
WT
Gravel Pit
Shelby Cemetery
Substa
Mansfield Lahm
Charles Mill Dam
Ruffner Mon
Widowmaker
Mohawk
Harrold
Loose
Sonora Mill
Windsor
Palomar
Edgewood
Rocco Tower
Taylortown
Gravel Pit
Gravel Pit
Gravel Pit

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

Flood discharges were established by valley flood routings computed using the Soil Conservation Service (SCS) watershed model "Project Formulation, Hydrology" (Reference 3). This program uses the Modified Att-kin Reach Routing Method for stream and valley flood routing. The model was calibrated to match previous high-water marks and historical flood data.

Peak discharge-drainage area relationships for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
BLACK FORK MOHICAN RIVER at mouth	60.6	7,510	10,040	11,020	13,530
WEST BRANCH BEAR RUN at mouth	1.2	330	450	500	610

TABLE 1 - SUMMARY OF DISCHARGES (continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
TUBY RUN at mouth	4.6	540	700	760	890
SELTZER PARK CREEK at mouth	3.5	1,020	1,400	1,540	1,560
HARTMAN BARGAHEISER DITCH at mouth	0.9	240	320	350	430
WEST BRANCH at mouth	4.6	950	1,250	1,370	1,610

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections and dimensions of backwater-producing structures were obtained from field survey.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

Channel and floodplain roughness factors (Manning's "n") used in the hydraulic computations were developed using the "Guide for Selecting Roughness Coefficient "n" Values for Channels" (Reference 4) and from field observation. The roughness coefficients used are shown below:

STREAM	CHANNEL "n"	FLOODPLAIN "n"
Black Fork Mohican River	0.035-0.054	0.050-0.120
West Branch	0.032-0.042	0.075-0.080
West Branch Bear Run	0.040	0.080
Hartman Bargaheiser Ditch	0.031-0.036	0.040-0.100
Tuby Run	0.030-0.060	0.055-0.110
Seltzer Park Creek	0.026-0.072	0.040-0.120

The SCS water-surface profile program, WSP-2 (step-backwater method) (Reference 5), was used to determine water-surface elevations for the range of discharges using roughness coefficients and surveyed cross sections. Computed profiles were compared to high-water marks and found to agree closely.

The floodway width was computed using the SCS "Floodway Determination Computer Program" (Reference 6). The floodway width was determined by equal conveyance.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 50- and 100-year flood elevations are close together, due to limitations of the profile scale, only the 100-year profile has been shown.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 with a contour interval of 10 feet (Reference 7).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE) and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and

increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 2, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map. In cases where the floodway and the 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than the State's allowable surcharge at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

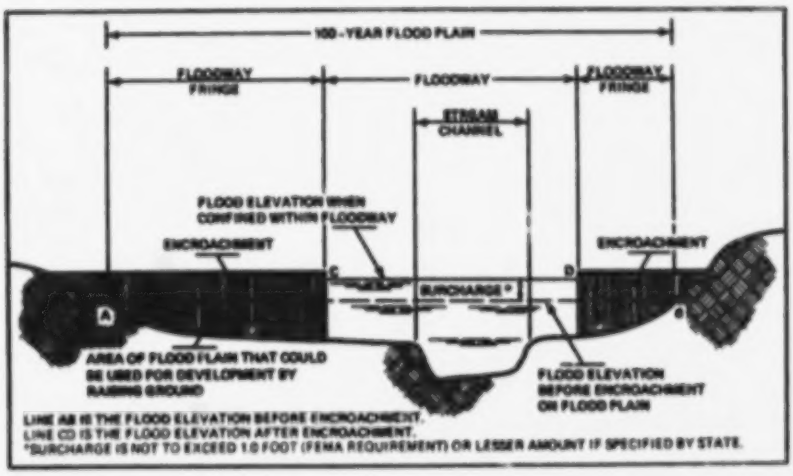

100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE *
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FIGURE 2 - Floodway Schematic

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
BLACK FORK MOHICAN RIVER								
A	2380	311[3]	2424	2.6	1074.8	1074.8	1075.8	1.0
B	6440	468	3338	2.0	1079.1	1079.1	1080.1	1.0
C	7430	330	2571	2.6	1079.5	1079.5	1080.5	1.0
D	7775	102	1012	6.7	1080.0	1080.0	1081.0	1.0
E	8610	137	1304	5.2	1182.8	1182.8	1183.8	1.0
F	10,350	60	744	9.3	1085.8	1085.8	1086.8	1.0
G	11,615	298	2596	2.1	1089.1	1089.1	1090.1	1.0
H	12,270	214	1887	2.9	1089.3	1089.3	1090.3	1.0
I	13,620	126	1344	4.1	1090.3	1090.3	1091.3	1.0
J	14,910	279	1892	2.9	1091.4	1091.4	1092.4	1.0
K	15,410	291	1847	3.0	1091.8	1091.8	1092.8	1.0
L	15,670	209	1582	3.6	1092.8	1092.8	1093.8	1.0
M	16,495	427	2173	2.6	1094.0	1094.0	1095.0	1.0
WEST BRANCH								
A	715[2]	156	920	1.5	1095.4	1095.4	1096.4	1.0
B	1385[2]	34	299	4.6	1095.7	1095.7	1096.7	1.0

[1]FEET ABOVE LONDON WEST ROAD
[2]FEET ABOVE MOUTH
[3]THIS WIDTH IS BEYOND CORPORATE LIMITS

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHELBY, OH
(RICHLAND CO.)

FLOODWAY DATA

BLACK FORK MOHICAN RIVER—WEST BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
SELTZER PARK CREEK								
A	475	87	680	2.3	1089.3	1089.3	1090.3	1.0
B	655	36	335	4.6	1089.3	1089.3	1090.3	1.0
C	953	46	372	4.1	1093.2	1093.2	1094.2	1.0
D	1233	58	386	4.0	1093.3	1093.3	1094.3	1.0
E	1568	142	1074	1.4	1094.9	1094.9	1095.9	1.0
F	2288	110	786	2.0	1095.2	1095.2	1096.2	1.0
G	2548	128	758	2.0	1095.3	1095.3	1096.3	1.0
H	3328	35	210	7.3	1096.7	1096.7	1097.7	1.0
I	3853	26	148	10.4	1099.4	1099.4	1100.4	1.0
J	4703	34	191	8.0	1103.2	1103.2	1104.2	1.0
K	5523	32	195	7.9	1107.0	1107.0	1108.0	1.0
L	6913	35	219	7.0	1112.0	1112.0	1113.0	1.0
M	7673	32	209	7.4	1114.8	1114.8	1115.8	1.0
N	7763	68	538	2.9	1121.5	1121.5	1122.5	1.0
O	8363	93	898	1.7	1121.7	1121.7	1122.7	1.0
P	8584	195	2007	0.6	1123.9	1123.9	1124.9	1.0

[1]FEET ABOVE MOUTH

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHELBY, OH
(RICHLAND CO.)

FLOODWAY DATA

SELTZER PARK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
HARTMAN BARGAHEISER DITCH								
A	1925	130	753	0.5	1083.9	1083.9	1084.9	1.0
B	2290	167	864	0.4	1084.0	1084.0	1085.0	1.0
C	2850	22	116	3.1	1084.5	1084.5	1085.5	1.0
D	3760	38	134	2.6	1085.2	1085.2	1086.2	1.0
E	4956	91	322	1.1	1089.1	1089.1	1090.1	1.0
F	5726	34	129	2.7	1090.5	1090.5	1091.5	1.0
G	6546	20	84	4.2	1092.5	1092.5	1093.5	1.0
H	7921	24	113	3.1	1096.9	1096.9	1097.9	1.0
WEST BRANCH BEAR RUN								
A	8795	39	132	3.8	1094.3	1094.3	1095.3	1.0
B	9880	28	104	4.8	1100.8	1100.8	1101.8	1.0

[1]FEET ABOVE MOUTH

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHELBY, OH
(RICHLAND CO.)

FLOODWAY DATA

HARTMAN BARGAHEISER DITCH— WEST BRANCH BEAR RUN

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
TUBY RUN								
A	782	50	467	1.6	1090.3	1090.3	1091.3	1.0
B	1462	62	329	2.3	1090.6	1090.6	1091.6	1.0
C	1857	60	261	2.9	1091.0	1091.0	1092.0	1.0
D	2369	128	835	0.9	1098.0	1098.0	1099.0	1.0
E	3092	124	918	0.8	1098.3	1098.3	1099.3	1.0
F	3502	54	446	1.7	1098.4	1098.4	1099.4	1.0
G	5557	60	203	3.7	1102.0	1102.0	1103.0	1.0
H	6827	48	260	2.9	1103.4	1103.4	1104.4	1.0

[1]FEET ABOVE MOUTH

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHELBY, OH
(RICHLAND CO.)

FLOODWAY DATA

TUBY RUN

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

This Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for the City of Shelby, Ohio (Reference 8).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 175 West Jackson Boulevard, 4th Floor, Chicago, Illinois 60604.

9.0 REFERENCES AND BIBLIOGRAPHY

1. U.S. Department of Agriculture, Soil Conservation Service, Flood Plain Management Study, Black Fork of Mohican River and Tributaries, Richland County, Ohio, January 1987.

2. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Ohio, Washington, D.C., February 1982.

3. U.S. Department of Agriculture, Soil Conservation Service, Engineering Division, Technical Release No. 20, Computer Program for Project Formulation, Hydrology, May 1965.

4. ----------, Soil Conservation Service, Guide for Selecting Roughness Coefficient "n" Values for Channels, Milwaukee, Wisconsin, December 1963.

5. ----------, Soil Conservation Service, Technical Release No. 61, WSP-2 Computer Program, May 1976.

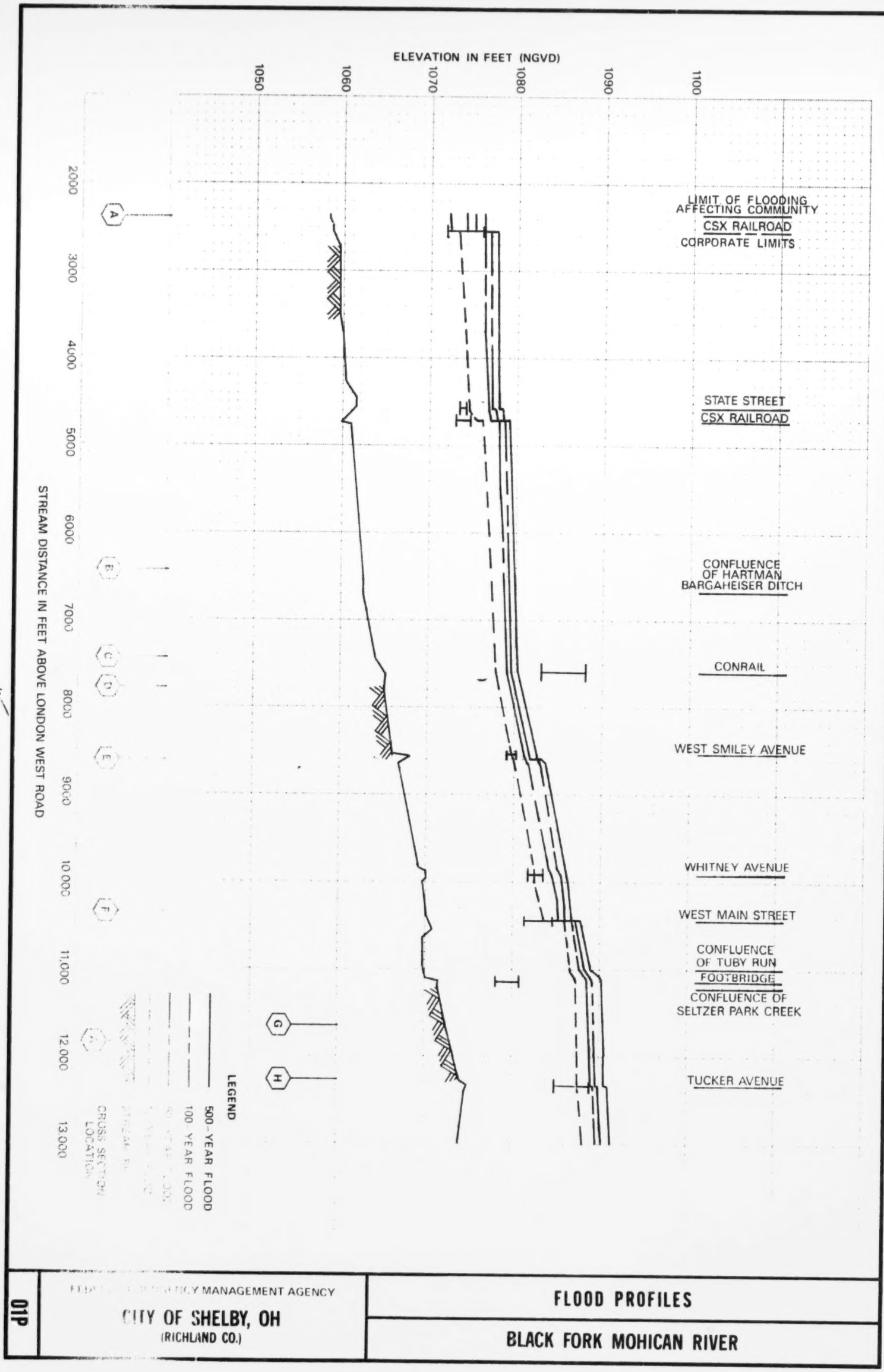
6. ----------, Soil Conservation Service, Technical Release No. 64, Floodway Determination Computer Program, Glenn Dale, Maryland, June 1978.

7. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 10 Feet: Crestline, Ohio, 1960, photorevised 1982; Shelby, Ohio, 1960, photoinspected 1974.

8. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Shelby, Richland County, Ohio, October 1975.

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0001	1,082.59	north rim of manhole cover of Sunset Drive culvert for Hartman Bargaheiser Ditch
2	0003	1,086.97	U.S. Geological Survey plate set on southeast parapet wall of Main Street bridge over the Black Fork Mohican River
3	0003	1,081.75	chisel mark on northeast corner of southwest wingwall of footbridge over the Black Fork Mohican River
4	0004	1,087.25	chisel mark on northeast corner of northwest wingwall of High School Avenue bridge over Seltzer Park Creek, 5 feet west of centerline of road
5	0004	1,093.13	chisel mark on south angle point of northwest wingwall of Mansfield Avenue bridge over Seltzer Park Creek
6	0004	1,088.08	chisel mark on northwest corner of northwest wingwall of Parkwood Drive bridge over Seltzer Park Creek
7	0004	1,098.09	chisel mark on northwest corner of west headwall of culvert for Seltzer Park Creek under Maxwell Drive
8	0004	1,096.52	chisel mark on southwest corner of northeast wingwall of culvert for Seltzer Park Creek under Glenwood Drive



15

01P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF SHELBY, OH (RICHLAND CO.)	FLOOD PROFILES BLACK FORK MOHICAN RIVER

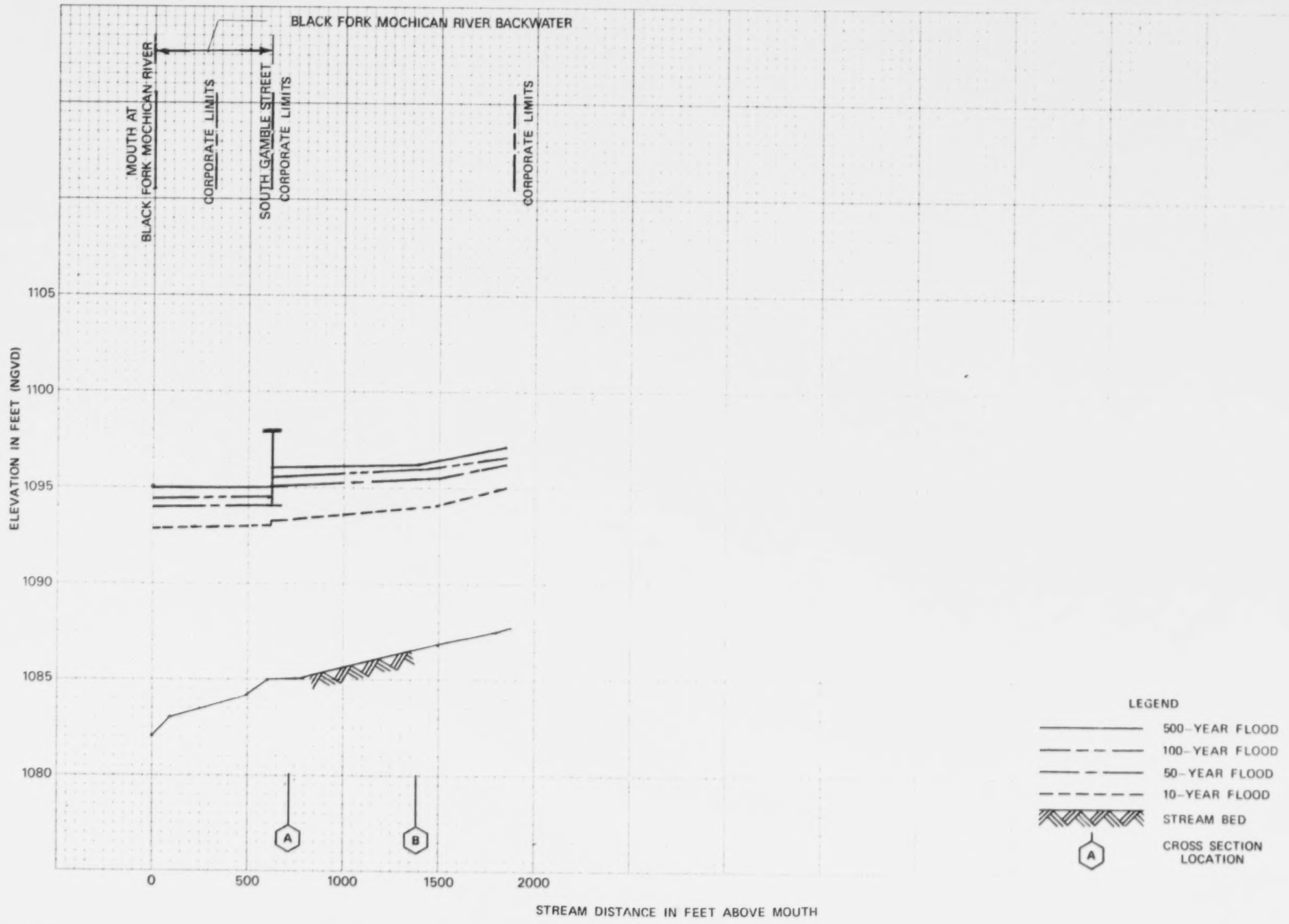
FLOOD PROFILES

BLACK FORK MOHICAN RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHELBY, OH
(RICHLAND CO.)

02P



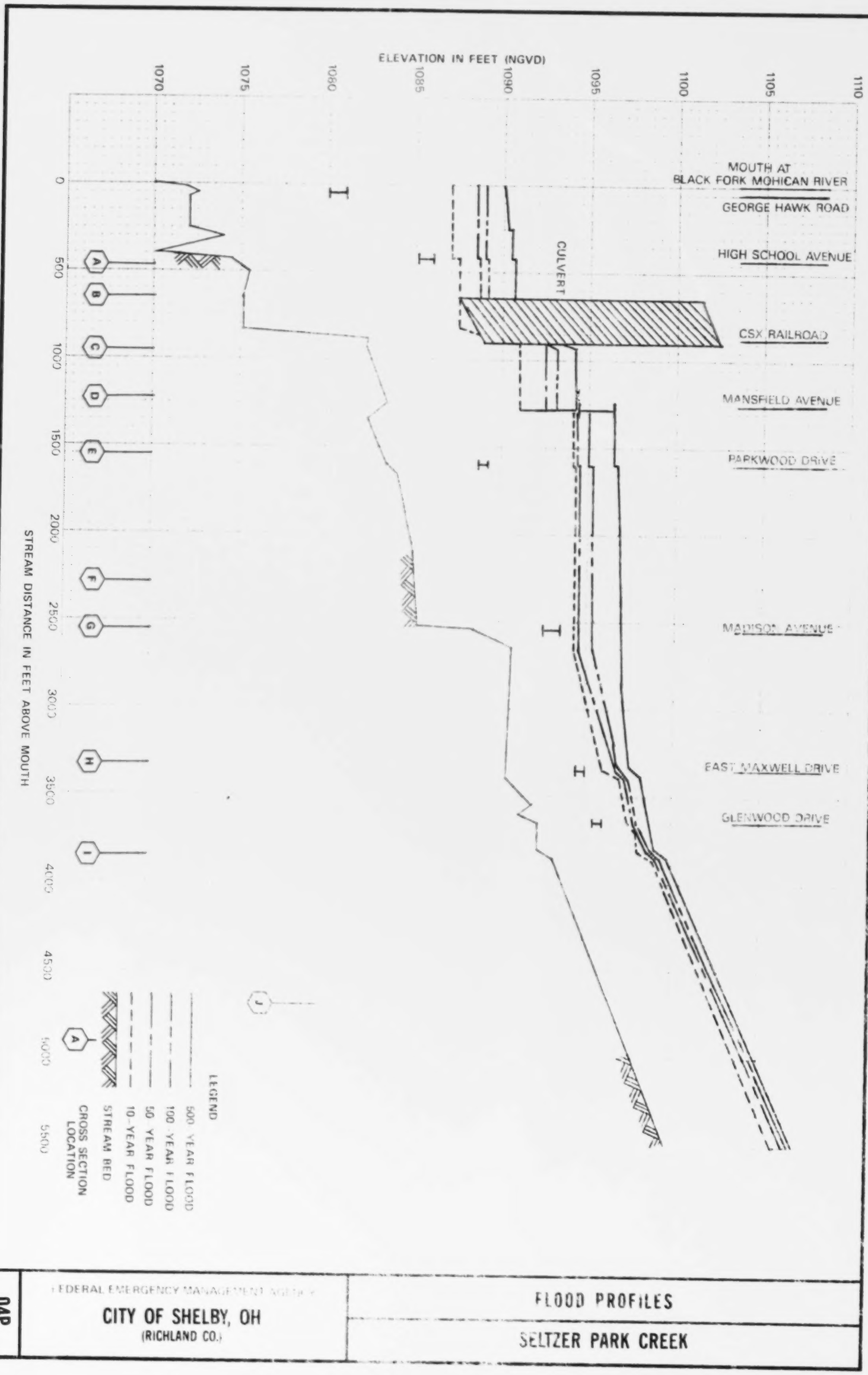
FLOOD PROFILES

WEST BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHELBY, OH
(RICHLAND CO.)

03P



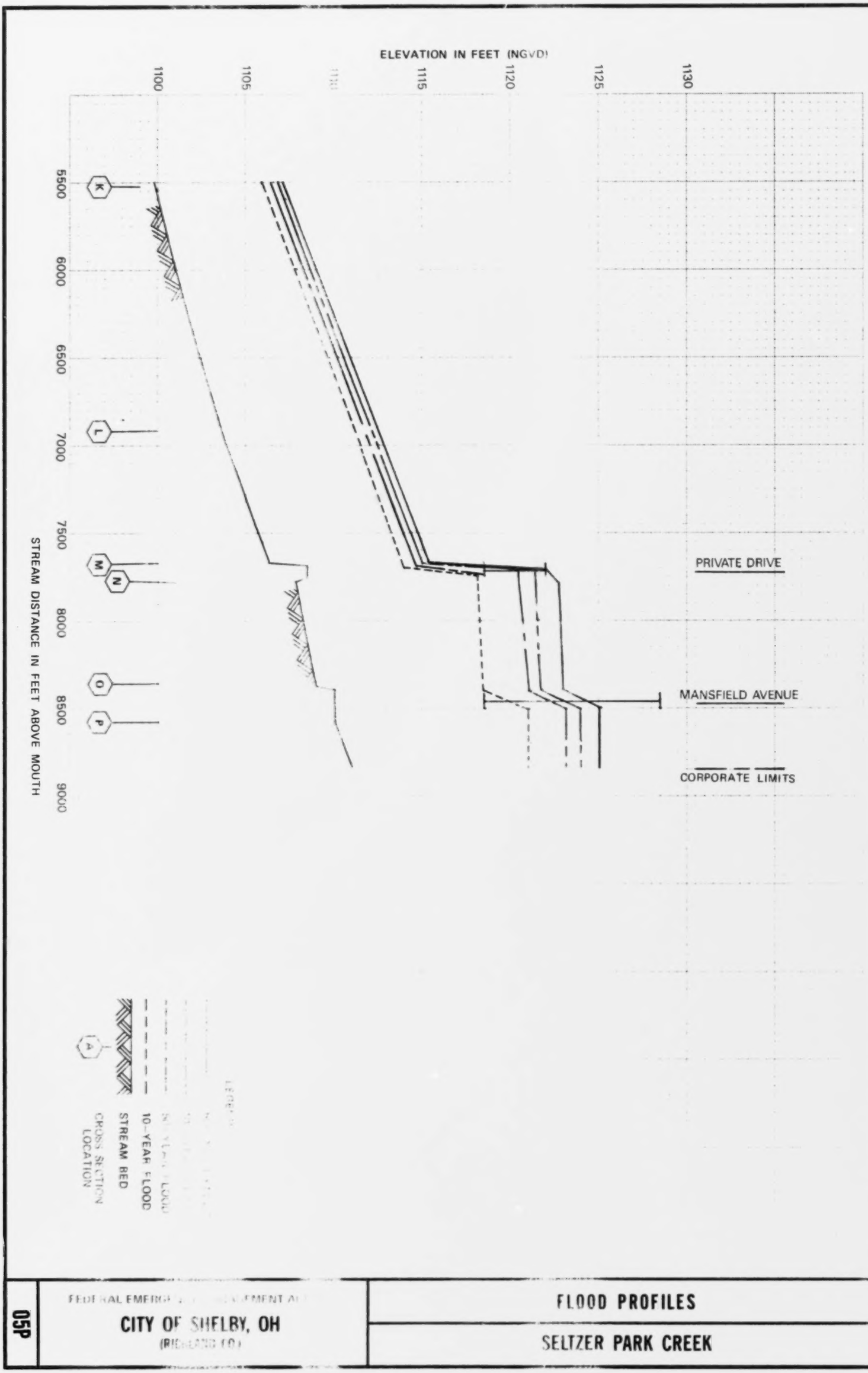
04P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHELBY, OH
(RICHLAND CO.)

FLOOD PROFILES

SELTZER PARK CREEK



19

05P

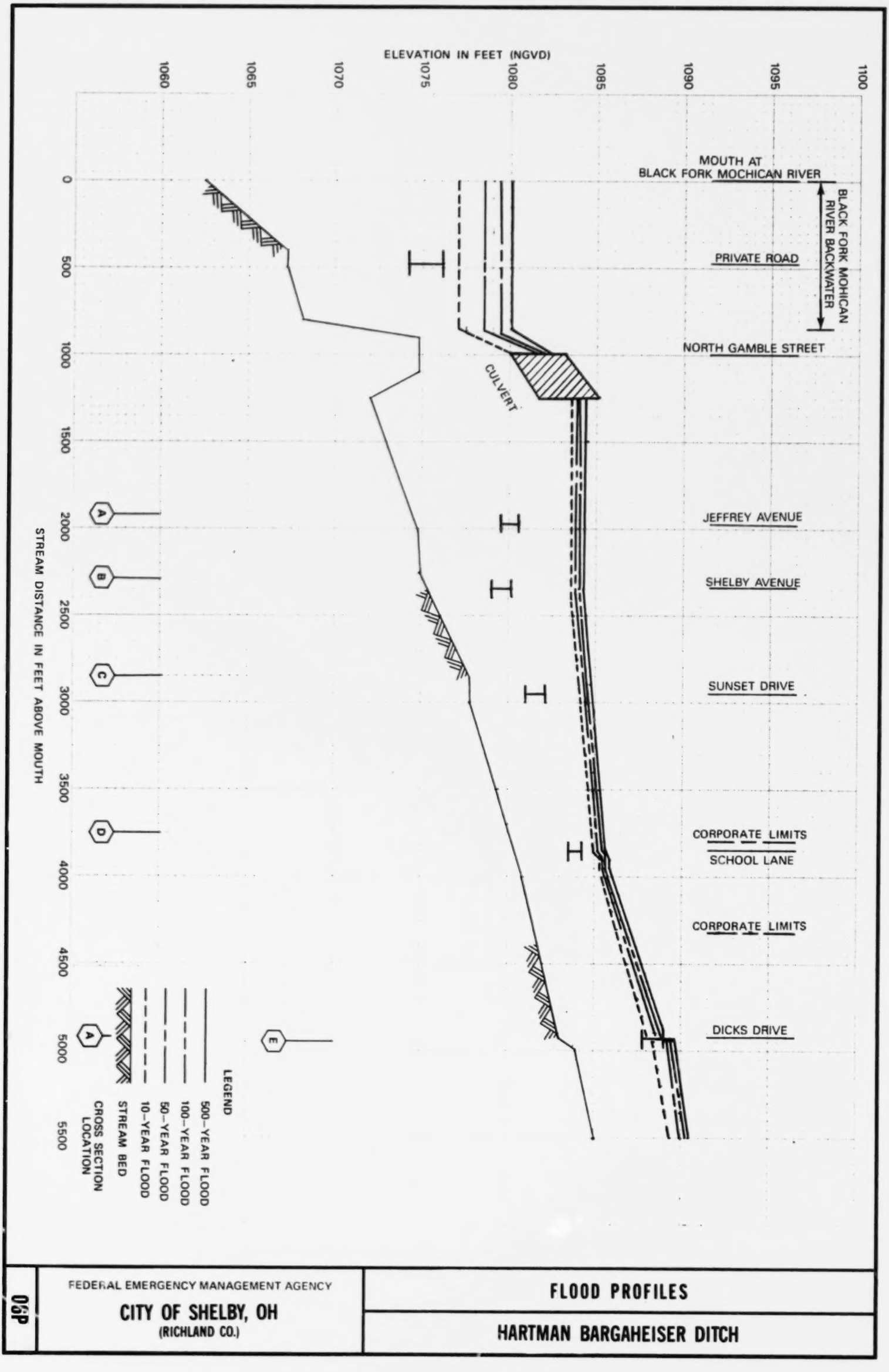
FEDERAL EMERG[illegible]

CITY OF SHELBY, OH

(RICHLAND CO.)

FLOOD PROFILES

SELTZER PARK CREEK



20

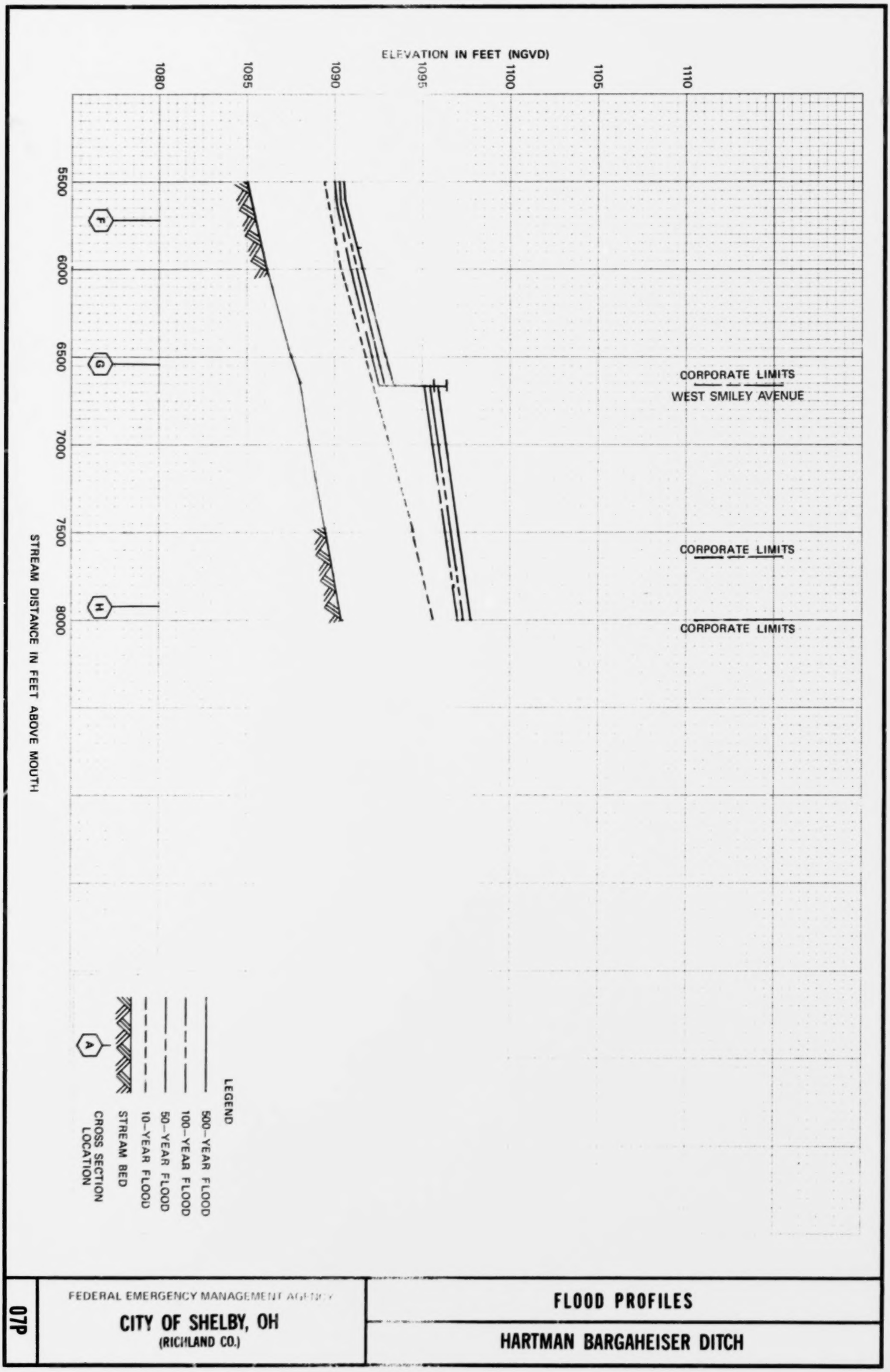
06P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHELBY, OH
(RICHLAND CO.)

FLOOD PROFILES

HARTMAN BARGAHEISER DITCH



07P

FEDERAL EMERGENCY MANAGEMENT AGENCY

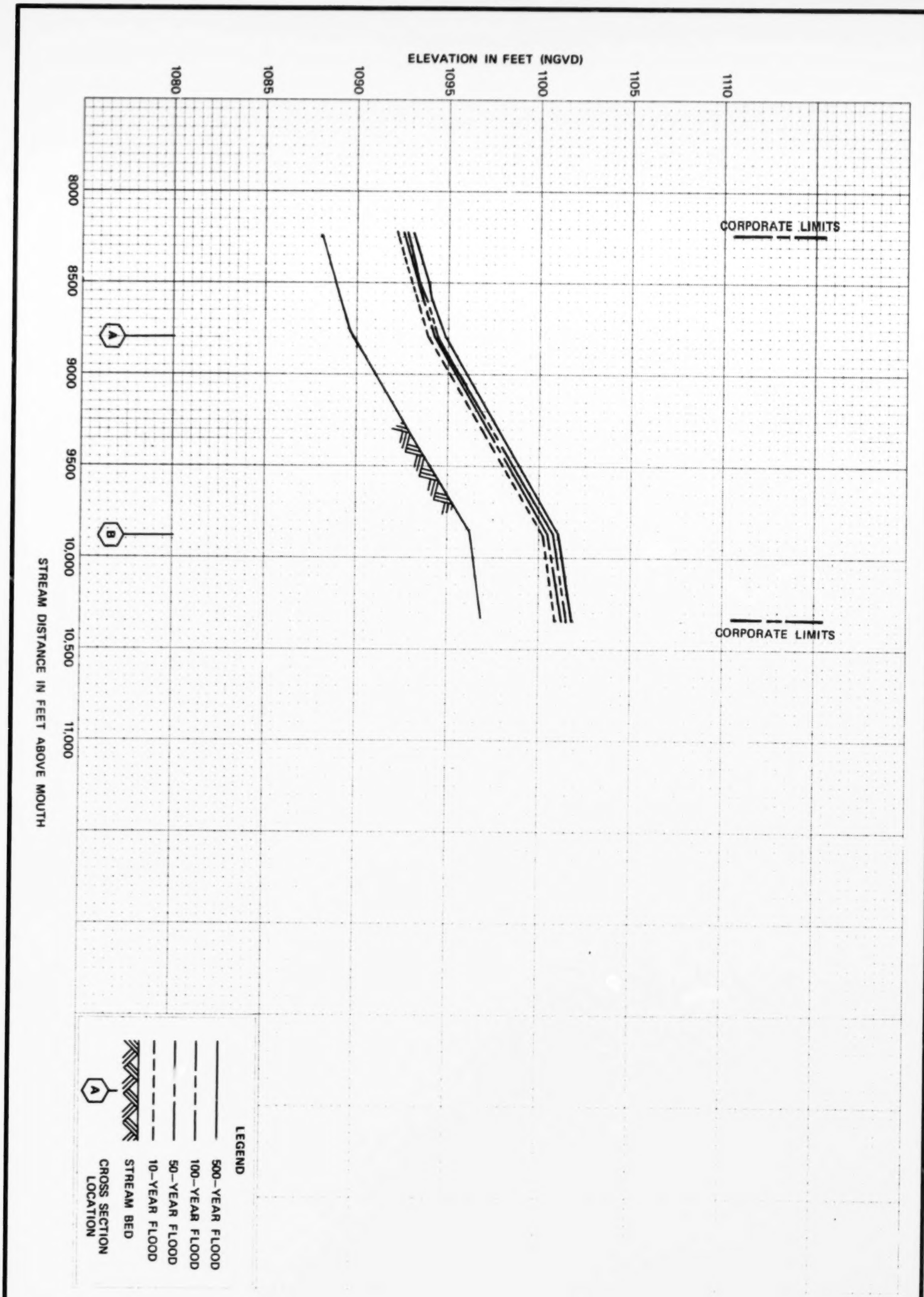
CITY OF SHELBY, OH

(RICHLAND CO.)

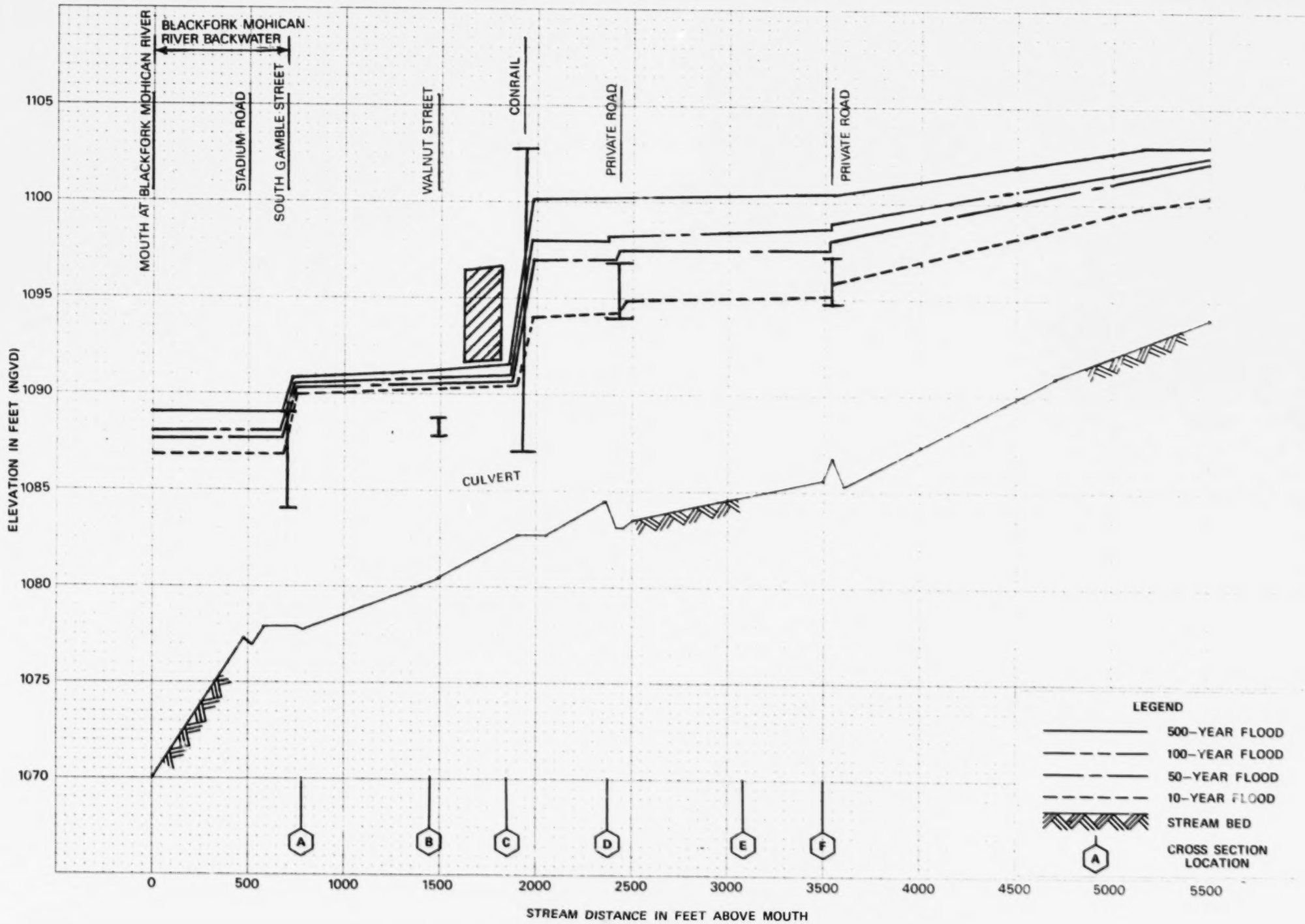
FLOOD PROFILES

HARTMAN BARGAHEISER DITCH

21



08P	FEDERAL EMERGENCY MANAGEMENT AGENCY **CITY OF SHELBY, OH** (RICHLAND CO.)	**FLOOD PROFILES** **WEST BRANCH BEAR RUN**



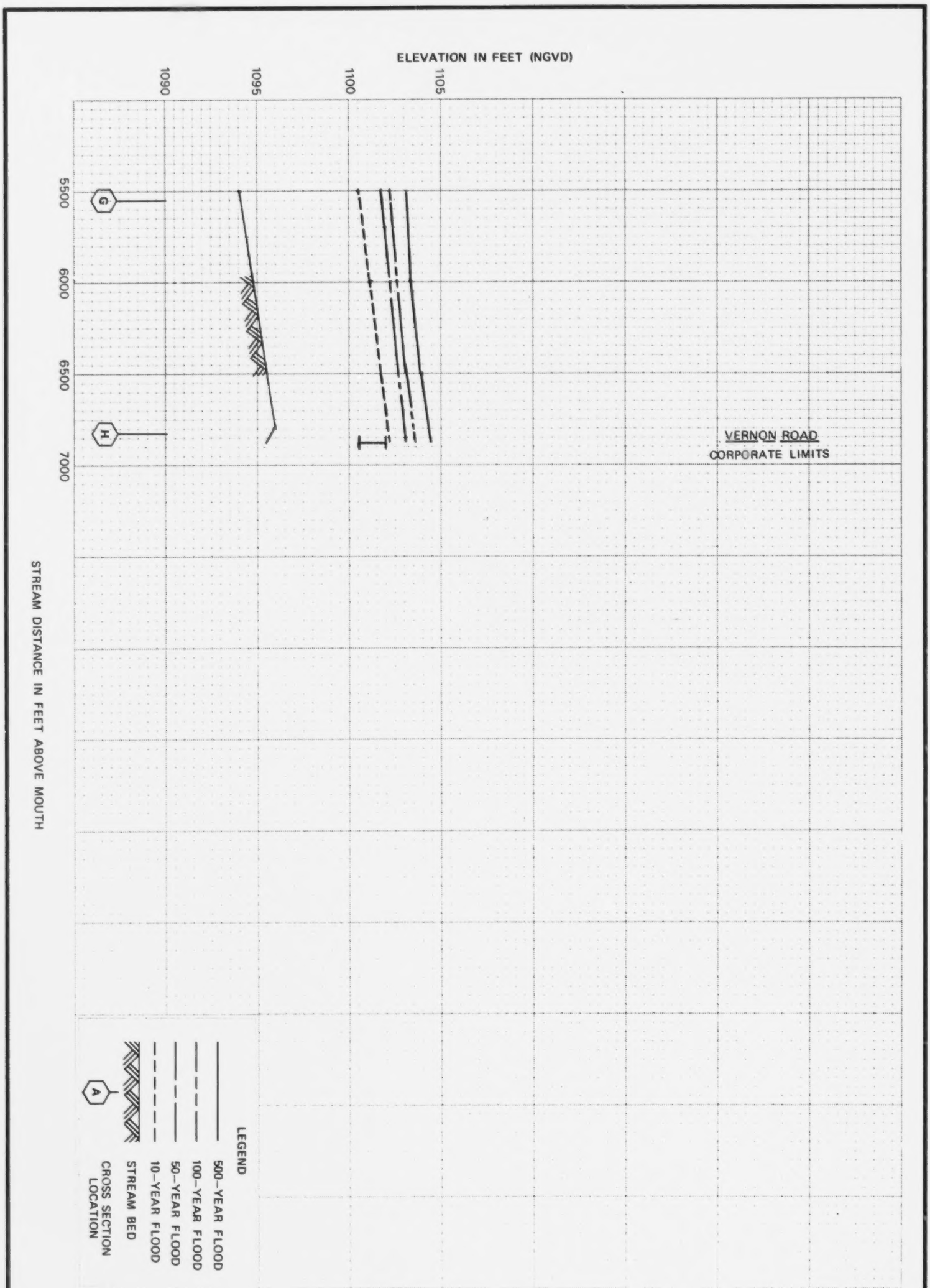
FLOOD PROFILES

TUBY RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHELBY, OH
(RICHLAND CO.)

09P



10P

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SHELBY, OH
(RICHLAND CO.)

FLOOD PROFILES

TUBY RUN